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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/733,570	12/12/2003	James Richard Weber	08350.1649-01000	1629

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EXAMINER	
GIMIE, MAHMOUD	
ART UNIT	**PAPER NUMBER**
3747	

DATE MAILED: 02/17/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/733,570	WEBER ET AL.	
	Examiner	Art Unit	
	Mahmoud Gimie	3747	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *31 January 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-4,6-13,15-17,19,24,25,28,29,31,32 and 34-67* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4, 6-13,15-17,19,24,25,28,29,31,32 and 34-67* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *12 December 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *1/20/06*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

2. Claims 1,2,6,7,24,25,34-38,41,42,45,46,48,49 and 52 are rejected under 35 U.S.C. 102(e) as being anticipated by Kimura et al (6,332,447).

Kimura et al disclose a variable compression ratio internal combustion engine (1), comprising, an engine block defining at least one cylinder, a head connected with said engine block, including an air intake port, and an exhaust port; a piston slidable in each cylinder, a combustion chamber being defined by said head, said piston, and said cylinder; an air intake valve (22) movable to open and close the air intake port; an air supply system including at least one turbocharger (5 and compressor, see figure 1) fluidly connected to the air intake port; a fuel supply system operable to inject fuel into the combustion chamber at a selected timing, a variable intake valve closing

mechanism (41) configured to keep the intake valve open by operation of the variable intake valve closing mechanism, and a controller configured (20) to operate the fuel supply system to supply a pilot injection (col. 7 and ll. 25) of fuel before a main injection of fuel, see col. 6 and ll. 26-36.

With regard to claim 2, further including an air intake valve assembly connected with said intake valve, said air intake valve assembly adapted to cyclically move said intake valve (22).

With regard to claim 6, wherein the fuel supply system includes a fuel injector assembly.

With regard to claim 7, wherein the fuel injector assembly is operated at least one of hydraulically, mechanically, and electronically, see figure 1.

With regard to claim 24, wherein the main injection begins during a compression stroke of the piston.

With regard to claim 25, wherein the main injection ends during a combustion stroke of the piston.

With regard to claim 34, Kimura et al disclose a method of controlling an internal combustion engine (1) having a variable compression ratio, said engine having a block defining a cylinder, a piston slidable in said cylinder, and a head connected with said block, said piston, said cylinder, and said head defining a combustion chamber, the method comprising; pressurizing air (with compressor, figure 1); supplying said air to an intake manifold (2) of the engine, maintaining fluid communication between said combustion chamber and the intake manifold during a portion of an intake stroke and

through a portion of a compression stroke, and supplying a pressurized fuel directly to the combustion chamber during a portion of a combustion stroke.

With regard to claims 35-38,41,42,45,46,48,49 and 52, the claimed limitations are comparable to the above rejected claims. Therefore, see above rejected claims and at least figures 1 and 7.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 3,4,8-17,19,28-33,39,40,43,44,47,50,51,53-67 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kimura et al (6,332,447) in view of Beck et al (6,273,076).

Kimura et al disclose all the limitations as applied to claims 1,2,6,7,24,25,34-38,41,42,45,46,48,49 and 52 above except for conventional cam-operated valves and multiple turbochargers.

Beck et al disclose a cam-operated intake and exhaust valves (figures 4-6) and multiple turbochargers (figure 4).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the invention of Kimura et al by using conventional cam-operated intake and exhaust valves and multiple turbocharger or turbocharger/supercharger. The motivation to do so would have been to implement the invention to engines with conventional cam-

operated valves and to optimize the excess air ratio (lambda), air charge temperature and/or compression temperature of a compression ignition engine, see Beck et al col. 1.

With regard to 4, wherein the variable intake valve closing mechanism is operated at least one of hydraulically, pneumatically, mechanically, and electronically.

With regard to claims 8-17,19,28-33,39,40,43,44,47,50,51,53-67, see figures 4-6 of Beck et al and the above comparable rejections.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 1-4,6-13,15-17,19,24,25,28,29-32 and 34-67 are rejected under 35 U.S.C. 102(b) as being anticipated by Zappa et al.

Zappa et al disclose a variable compression ratio internal combustion engine, comprising, an engine block defining at least one cylinder, a head connected with said engine block, including an air intake pod, and an exhaust pod; a piston slidable in each cylinder, a combustion chamber being defined by said head, said piston, and said cylinder; an air intake valve movable to open and close the air intake port; an air supply system including at least one turbocharger fluidly connected to the air intake port; a fuel supply system operable to inject fuel into the combustion chamber at a selected timing', a variable intake valve closing mechanism configured to keep the intake valve open by operation of the variable intake valve closing mechanism, and a controller configured to

operate the fuel supply system to supply a pilot injection of fuel before a main injection of fuel, see figures 15 and on pages D19-20.

With regard to claim 2, further including an air intake valve assembly connected with said intake valve, said air intake valve assembly adapted to cyclically move said intake valve, see figure 3, page D19-14 and D19-3, last four paragraphs.

With regard to claim 3, wherein said air intake valve assembly includes a connectable with a rocker arm, said rocker arm being connected with said intake valve. With regard to claim 4, wherein the variable intake valve closing mechanism is operated at least one of hydraulically, pneumatically, mechanically, and electronically, see figure 3 and last four paragraphs of D19-3.

With regard to claim 6, wherein the fuel supply system includes a fuel injector assembly.

With regard to claim 7, wherein the fuel injector assembly is operated at least one of hydraulically, mechanically, and electronically.

With regard to claim 8, wherein the air supply system includes a second turbocharger arranged in series with the at least one turbocharger, see page D19-3, first-third paragraphs, and page D19-13, Figure 1.

With regard to claim 9, wherein the at least one turbocharger includes a turbine and two compressors.

With regard to claim 10, wherein the at least one turbocharger has a pressure ratio of at least 4:1 with respect to atmospheric pressure.

Zappa et al disclose a method of operating an internal combustion engine including at least one cylinder and a piston slidable in the cylinder, the method comprising: imparting

rotational movement to a first turbine and a first compressor of a first turbocharger with exhaust air flowing from an exhaust pod of the cylinder', imparting rotational movement to a second turbine and a second compressor of a second turbocharger with exhaust air flowing from an exhaust duct of the first turbocharger, compressing air drawn from atmosphere with the second compressor', compressing air received from the second compressor with the first compressor; supplying pressurized air from the first compressor to an air intake pod of a combustion chamber in the cylinder via an intake manifold', operating a fuel supply system to inject fuel directly into the combustion chamber, and operating an air intake valve to open the air intake pod to allow pressurized air to flow between the combustion chamber and the intake manifold during a portion of a compression stroke of the piston, wherein said operating a fuel supply system includes operating the fuel supply system to inject a pilot injection of fuel before a main injection of fuel.

With regard to claim 12, wherein said operating an air intake valve includes operating a variable intake valve closing mechanism to interrupt cyclical movement of the intake valve.

With regard to claims 13,15-17,19,24,25,28,29-32 and 34-67, the claimed subject matter is comparable to the above rejected claims.

Double Patenting

7. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct

from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

8. Claims 1-4, 6-13,15-17,19,24,25,28,29,31,32 and 34-67 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-33 of U.S. Patent No. 6,688,280. Although the conflicting claims are not identical, they are not patentably distinct from each other because the application is broader in some respect and adds obvious features in other respects, see In re Goodman for differences that appear as omitted limitations in the current application claims.

Response to Arguments

9. Applicant's arguments with respect to claims1-4,6-13,15-17,19,24,25,28,29-32 and 34-67 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mahmoud Gimie whose telephone number is 571-272-

4841. The examiner can normally be reached on Monday-Friday between 7 a.m. -3:30 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Henry Yuen can be reached on 571-272-4856. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

MG

MAHMOUD GIMIE
PRIMARY EXAMINER